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(54) **ELECTRICITY SUPPLY TOOL HOLDER FOR MACHINING CENTER**

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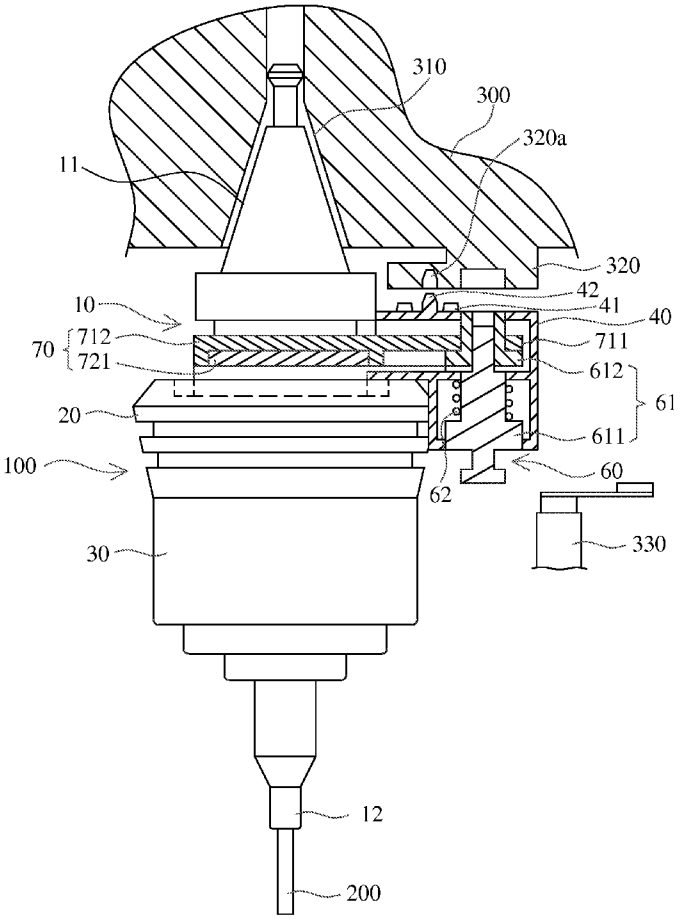
(57) **ABSTRACT**

An electricity supply tool holder for a machining center is provided, and has: a holder body, a stationary coil portion, a rotating coil portion, a lateral fixing portion, and an electrical machinery. The stationary coil portion is provided with a primary coil therein; the rotating coil portion is correspondingly provided with a secondary coil therein; and the lateral fixing portion is fixed on a side of the stationary coil portion used for removably combining with a machining center. When the tool holder is rotated, an external electric power/signal can be transmitted through the lateral fixing portion to the primary coil, then inducing the secondary coil, then the electric power/signal is transmitted to the electrical machinery. Additionally, the lateral fixing portion can be switched into a locked position to temporarily limit rotation, so that it can be used in a machining center of an Automatic Tool Changing (ATC) system.



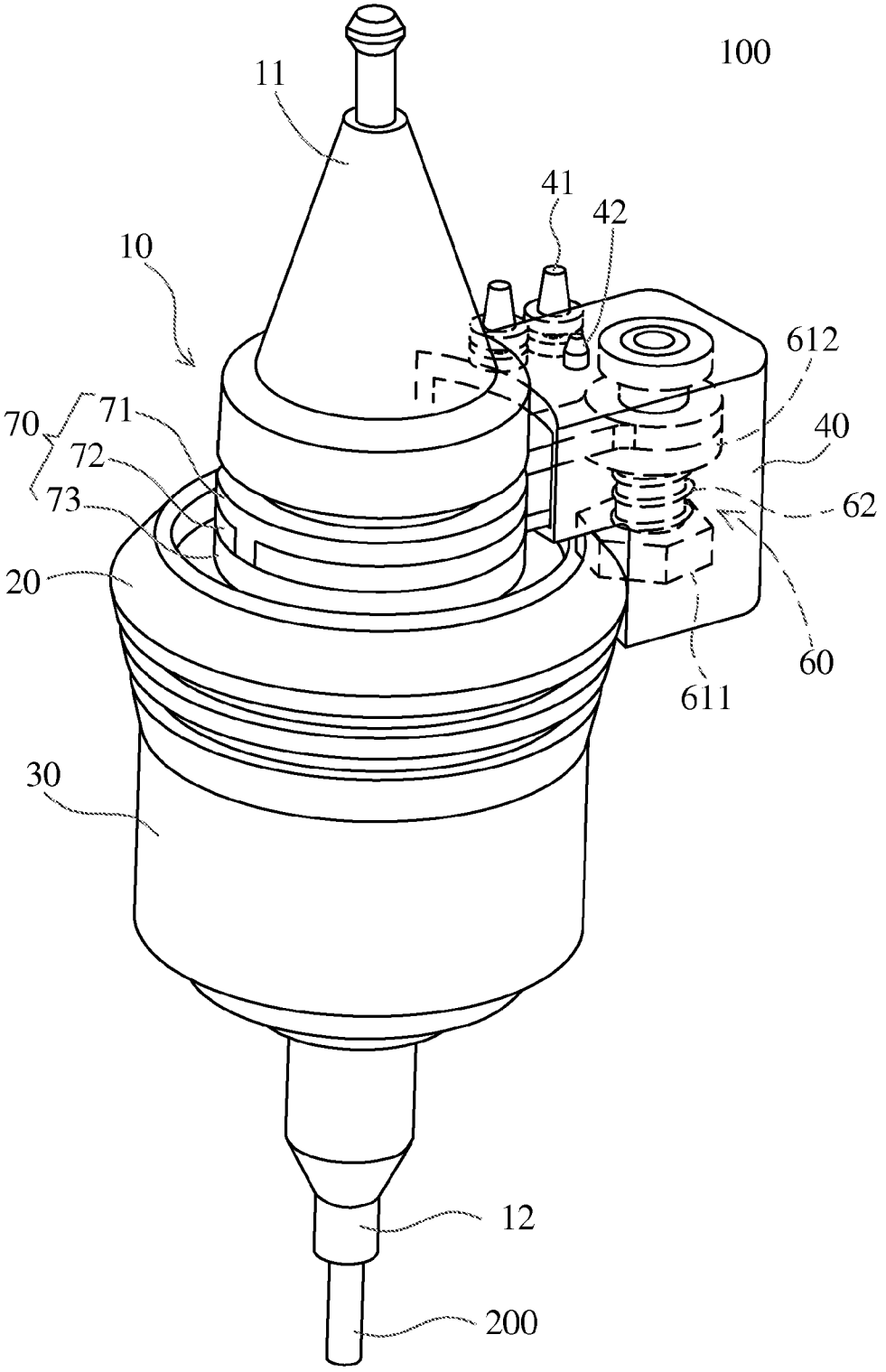


Fig.1

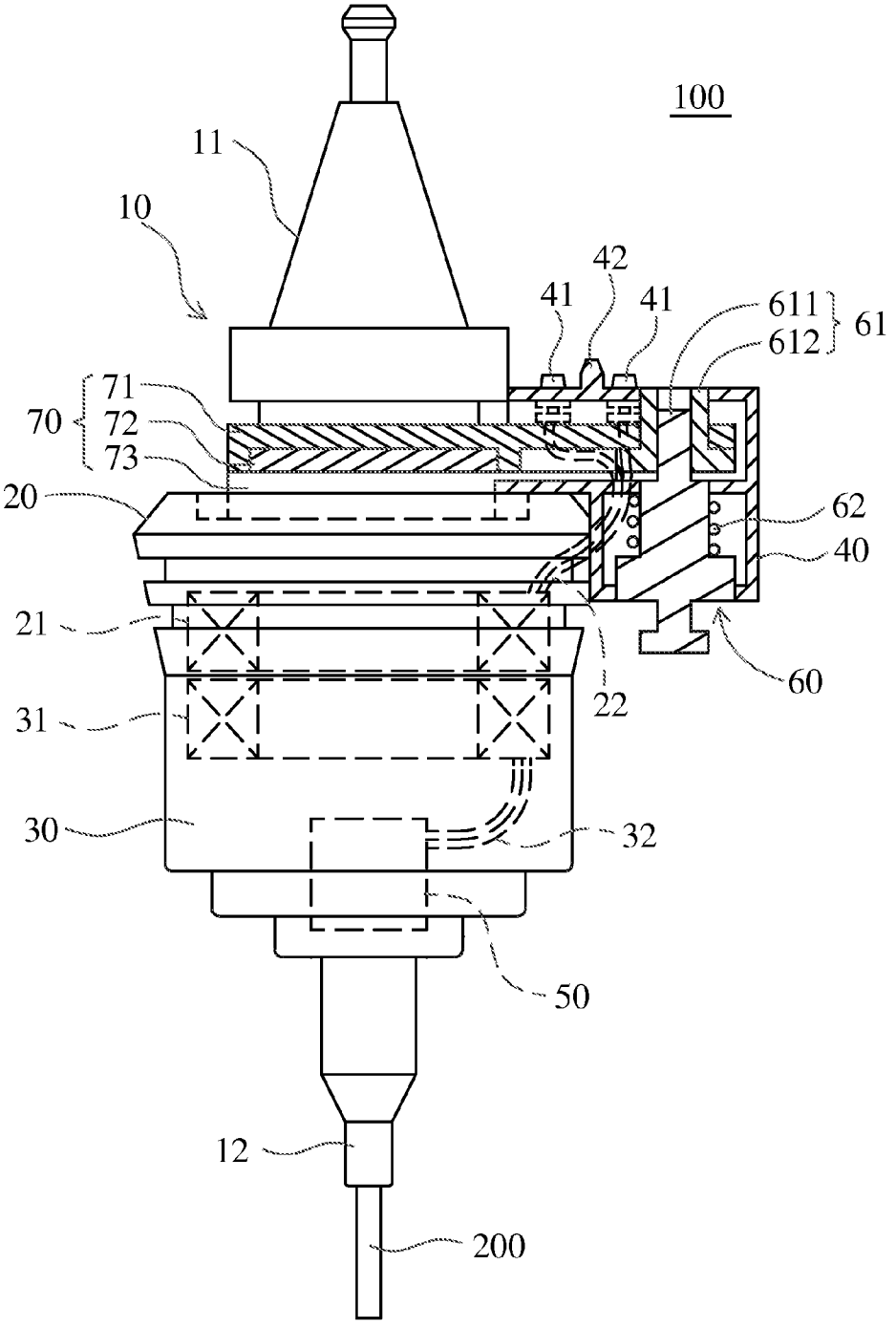

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Fig.2

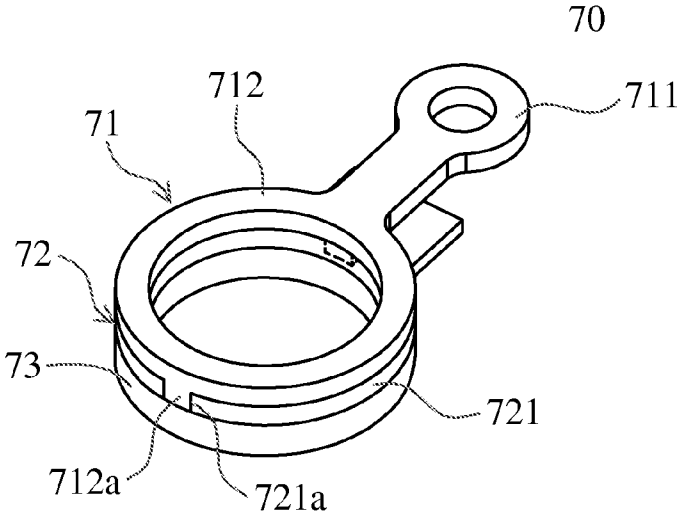
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Fig.3A

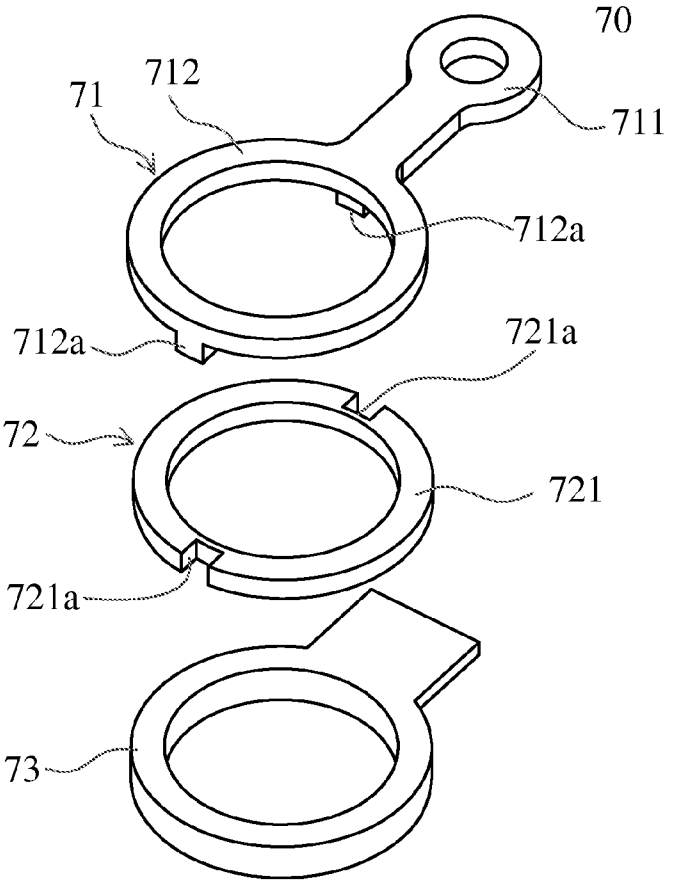
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Fig.3B

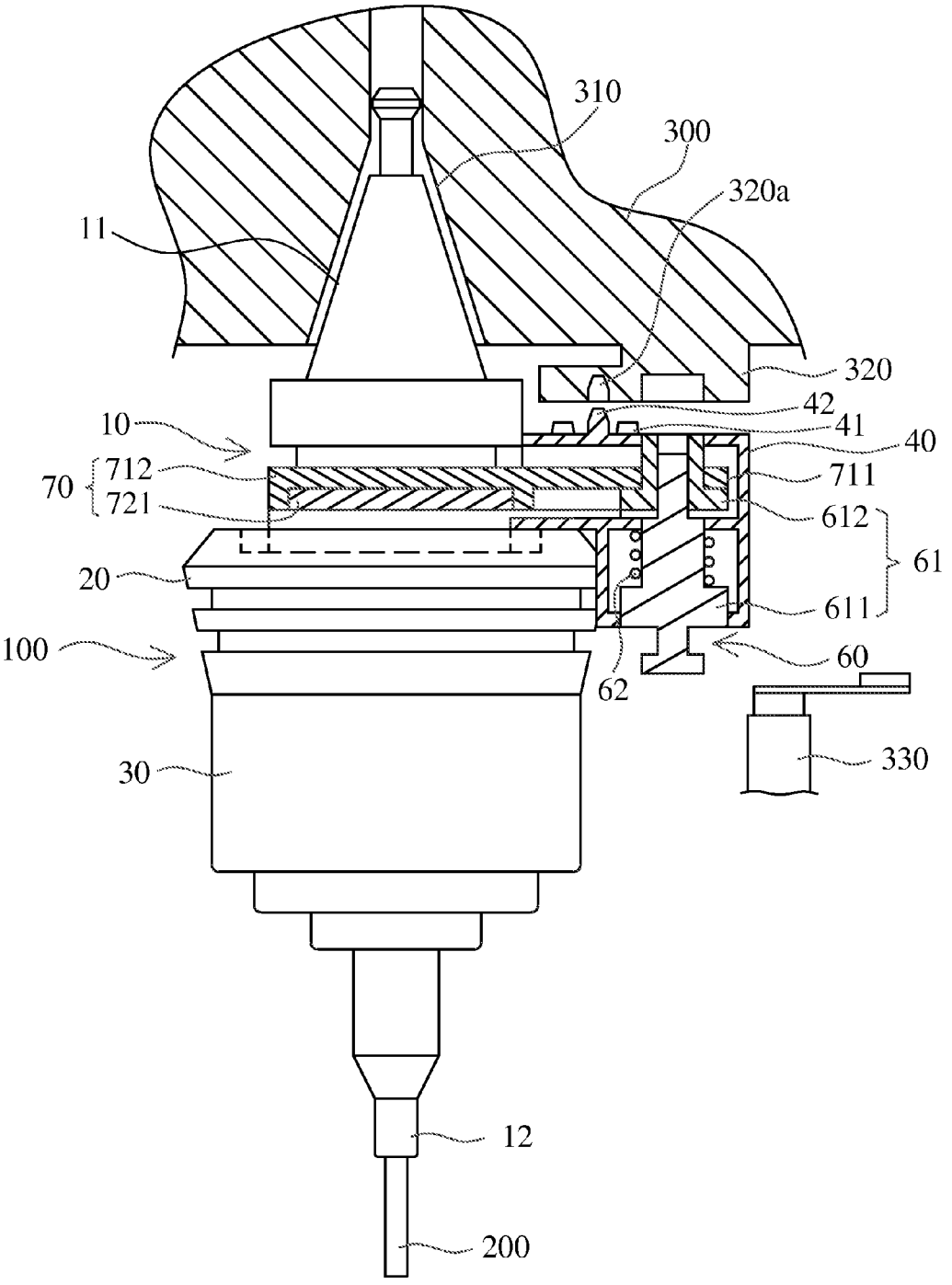
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Fig.4A

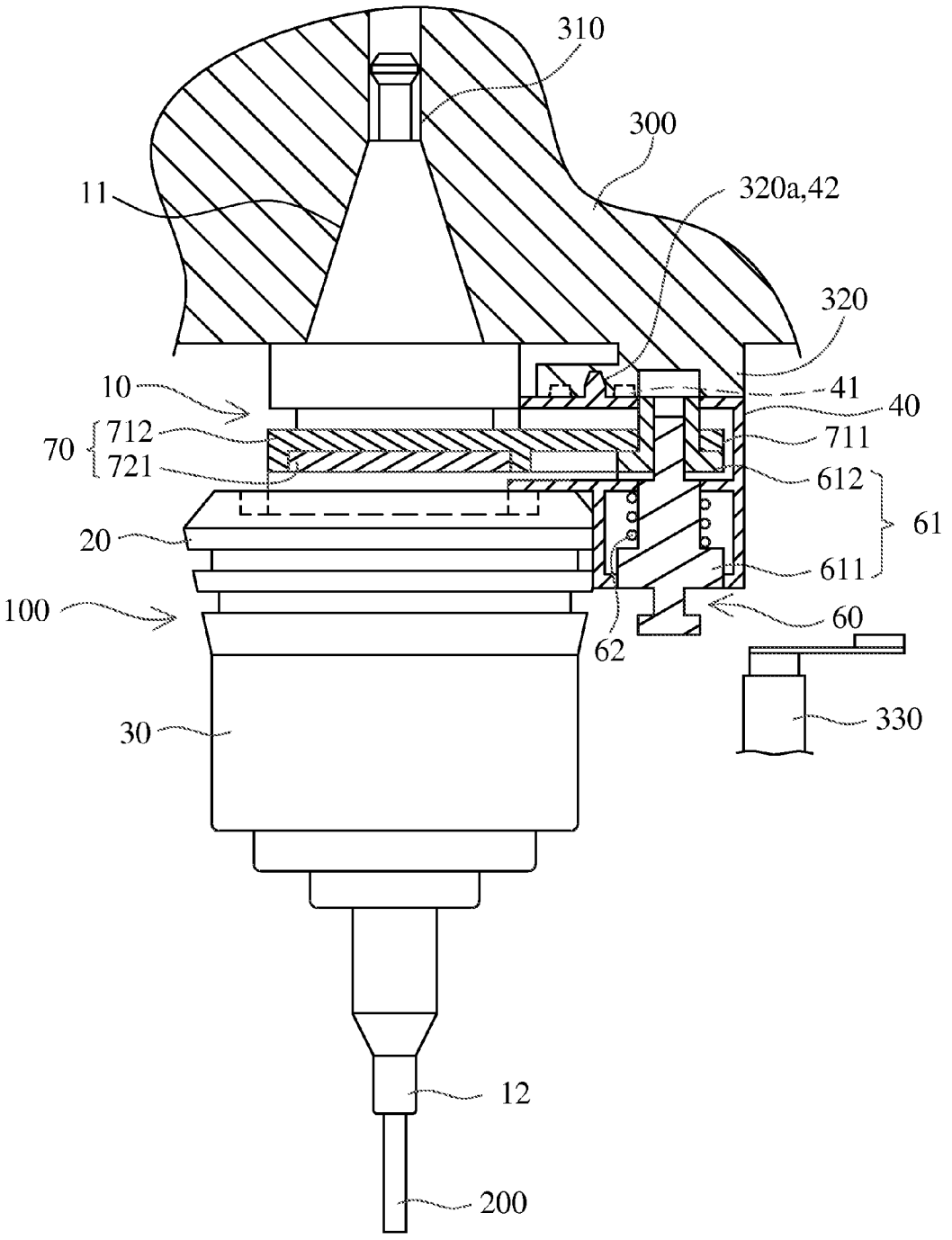
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Fig.4B

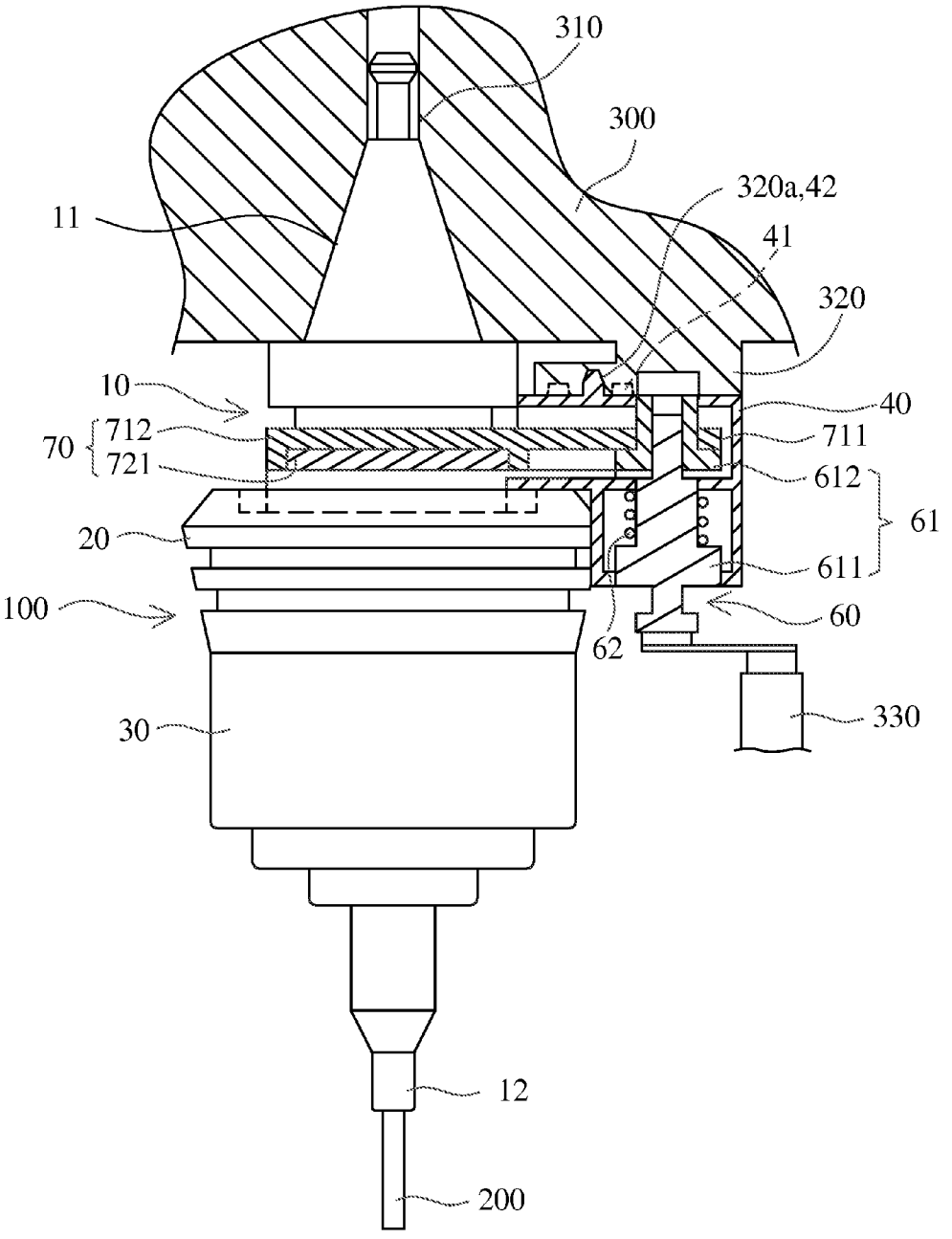
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Fig.4C

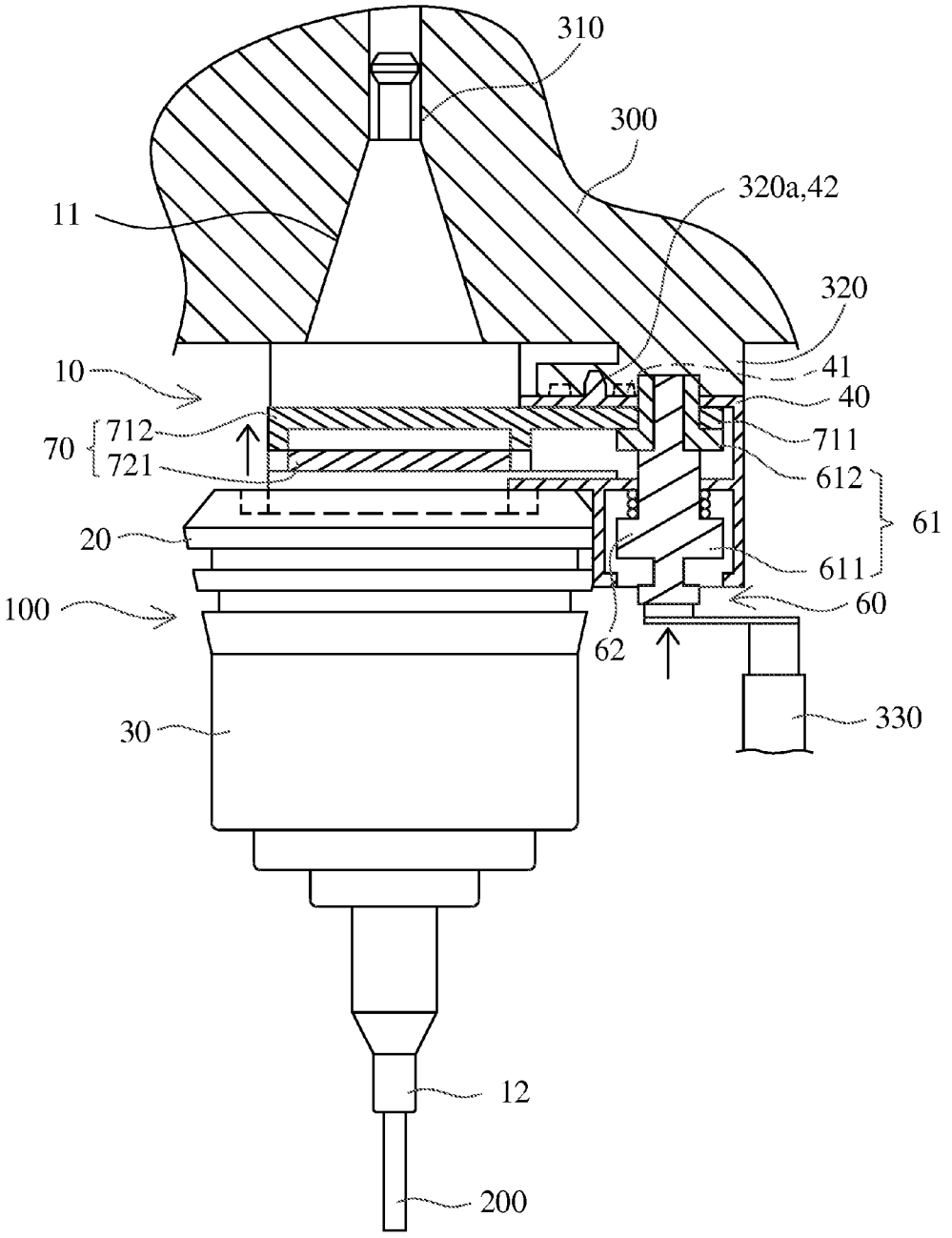
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Fig.4D

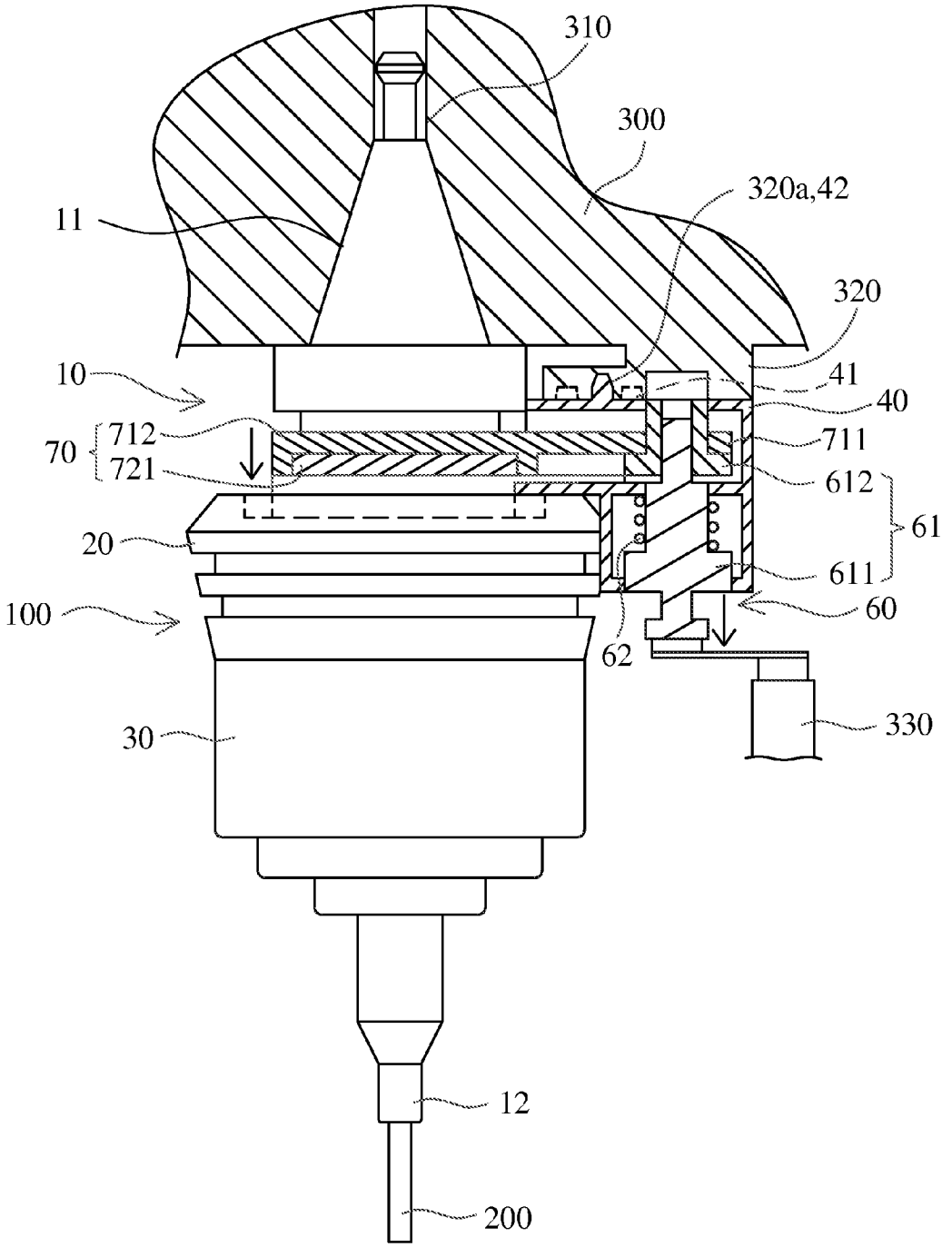
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Fig.5A

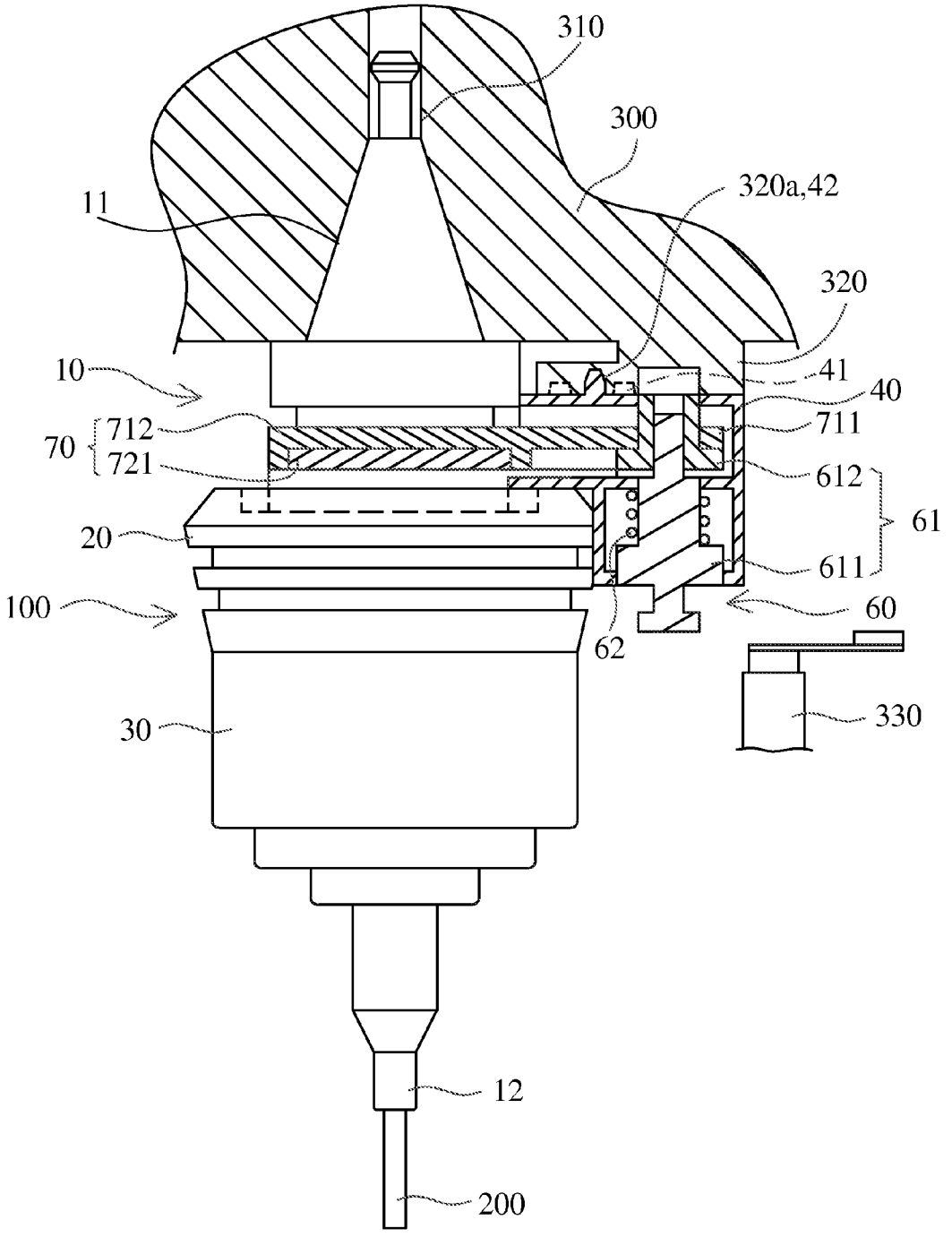
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Fig.5B

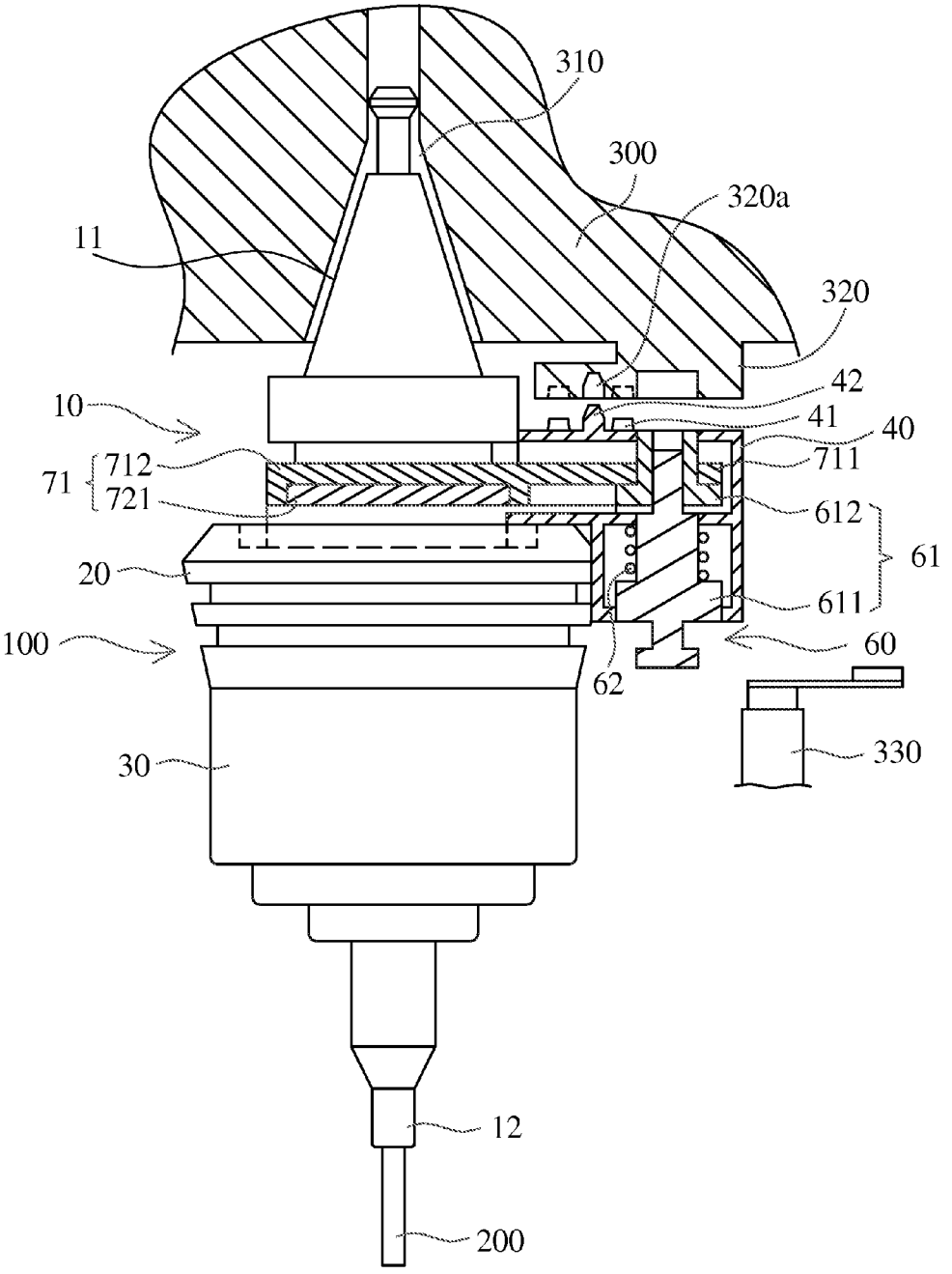
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Fig.5C

ELECTRICITY SUPPLY TOOL HOLDER FOR MACHINING CENTER

FIELD OF THE INVENTION

[0001] The present invention relates to an electricity supply tool holder for a machining center, and more particularly to a non-contact type electricity supply tool holder used in an Automatic Tool Changing (ATC) machining center.

BACKGROUND OF THE INVENTION

[0002] A high frequency vibration cutting is a new type machining technology, and by adding a high frequency vibration into a common cutting tool, an interrupted contact is generated between a cutting tool and a workpiece, and it fundamentally changes the conventional cutting method. This change can solve the problems existing in the conventional cutting technologies, for example the vibration and the heat accumulation during a cutting process or the unstable machining quality, so that the cutting effect is improved.

[0003] In a conventional high frequency vibration technology, a high frequency vibration device is disposed inside a tool holder, which is removably mounted on a machining center. Generally, the machining center having high frequency vibration has two methods to supply electric power, a contact type and a non-contact type. Because electrodes of the contact type are more easily worn, the non-contact type electricity supply is more frequently adopted in the new type of high frequency vibration machining center.

[0004] In the conventional technology of a non-contact type electricity supply, inductive coils are adopted, wherein a stationary coil is disposed in a machining center, and a rotating coil is disposed inside a tool holder, so that it can avoid an electrode wear phenomenon of a contact type electricity supply. However, since the machining center and the tool holder should both be special specifications, the whole cost of the machining center is increased, the tool holder cannot be universally used in the other machining centers, and they cannot be used in an Automatic Tool Changing (ATC) machining center.

[0005] Hence, it is necessary to provide an electricity supply tool holder for a machining center to solve the problems existing in the conventional technologies.

SUMMARY OF THE INVENTION

[0006] The object of the present invention is to provide an electricity supply tool holder for a machining center, which comprises a stationary coil portion and a rotating coil portion. The stationary coil portion is provided with a primary coil therein; the rotating coil portion is correspondingly provided with a secondary coil therein; and the secondary coil is electrically connected with an electrical machinery inside the electricity supply tool holder. When the electricity supply tool holder is rotated, an external electric power/signal can be transmitted through the primary coil, then inducing the secondary coil, then transmitted to the electrical machinery.

[0007] Another object of the present invention is: when dismounting the electricity supply tool holder from a machining center, the lateral fixing portion is switched into a locked position by a clutch assembly to temporarily limit rotation corresponding to the holder body, so that the electricity supply tool holder can be used in a machining center with an Automatic Tool Changing (ATC) system.

[0008] For achieving above-mentioned object, the present invention provides an electricity supply tool holder for a machining center, used in the machining center having a rotating shaft, and comprises:

[0009] a holder body formed as a columnar and including a holder shank disposed on an upper end thereof and a tool chuck disposed on a lower end thereof, wherein the holder shank is used for removably combining with a holder shank chuck of an end of the rotating shaft of the machining center; and the tool chuck is used for clamping and downwardly fixing a cutting tool;

[0010] a stationary coil portion coaxially and rotatably disposed on the holder body and being provided with at least one primary coil therein;

[0011] a rotating coil portion coaxially and fixedly disposed on the holder body and being provided with at least one secondary coil therein, wherein the secondary coil corresponds to the primary coil;

[0012] a lateral fixing portion fixed on a side of the stationary coil portion and used for removably combining with a fixing location of the machining center, wherein the lateral fixing portion comprises at least one set of input electrode portions, one end of which is removably and electrically connected to an electric source of the machining center, and the other end of which is electrically connected to the primary coil of the stationary coil portion by at least one set of first electric wires; and

[0013] an electrical machinery disposed inside the holder body and electrically connected to the secondary coil of the rotating coil portion by at least one set of second electric wires;

[0014] wherein when the electricity supply tool holder is mounted on the holder shank chuck of the machining center and starts to be rotated, the machining center transmits an electric power/signal to the set of first electric wires, then to the primary coil of the stationary coil portion, and the secondary coil of the rotating coil portion is induced to generate an electric power/signal, which is then transmitted to operate the electrical machinery.

[0015] In one of the embodiments of the present invention, the electrical machinery is disposed close to the tool chuck, and the rotating coil portion is disposed under the stationary coil portion so as to be close to the electrical machinery.

[0016] In one of the embodiments of the present invention, the electricity supply tool holder further comprises a control assembly and a clutch assembly; the control assembly at least includes a control element, which is disposed inside the lateral fixing portion and switchably has a first position and a second position; the clutch assembly at least includes a clutch element and an engaged element; one end of the clutch element is disposed inside the lateral fixing portion, and the other end thereof is disposed close to the holder body; the clutch element corresponds to the control element and moves therewith, and has a locked position and an unlocked position; the engaged element is fixedly connected with the holder body; when the control element is located at the first position, the clutch element is moved therewith to the locked position, and is engaged with the engaged element on the holder body, so that the holder body cannot be rotated corresponding to the lateral fixing portion; and when the control element is switched into the second position, the clutch element is moved therewith to the unlocked position, and is separated

from the engaged element on the holder body, so that the holder body can be freely rotated corresponding to the lateral fixing portion.

[0017] In one of the embodiments of the present invention, the control element is an ejector pin assembly, which is movably disposed on a bottom of the lateral fixing portion, and when the ejector pin assembly is pushed by an external push rod, the control element is switched from the first position to the second position.

[0018] In one of the embodiments of the present invention, the ejector pin assembly comprises an ejector pin and a hat-like bush; the diameter of a lower end of the hat-like bush is greater than the diameter of an upper end thereof; the hat-like bush is movably disposed on an upper end of the ejector pin, and the ejector pin and the hat-like bush are slid up and down inside the lateral fixing portion; the end close to the lateral fixing portion of the clutch element is formed as a hollow ring, which corresponds to the diameter of the upper end of the hat-like bush, so that when the ejector pin is pushed by the external push rod, the hat-like bush is moved therewith and then pushes the clutch element from the locked position to the unlocked position.

[0019] In one of the embodiments of the present invention, the clutch element has at least one convex portion, and the engaged element correspondingly has at least one concave portion, so that the clutch element is engaged with the engaged element by the convex portion of the clutch element and the concave portion of the engaged element.

[0020] In one of the embodiments of the present invention, the clutch element has at least one concave portion, and the engaged element correspondingly has at least one convex portion, so that the clutch element is engaged with the engaged element by the concave portion of the clutch element and the convex portion of the engaged element.

[0021] In one of the embodiments of the present invention, an end which is close to the holder body of the clutch element is provided with a first hollow disk which has a center circle hole passed through by the holder body, so that the first hollow disk is coaxially and rotatably disposed on the holder body; and the engaged element is correspondingly provided with a second hollow disk which has a center circle hole passed through by the holder body and is fixed thereon.

[0022] In one of the embodiments of the present invention, the first hollow disk of the clutch element has at least one convex key, and the second hollow disk of the engaged element correspondingly has at least one concave groove, so that the first hollow disk is engaged with the second hollow disk by the convex key of the clutch element and the concave groove of the engaged element.

[0023] In one of the embodiments of the present invention, the first hollow disk of the clutch element has at least one convex groove, and the second hollow disk of the engaged element correspondingly has at least one concave key, so that the first hollow disk is engaged with the second hollow disk by the convex groove of the clutch element and the concave key of the engaged element.

[0024] In one of the embodiments of the present invention, the clutch assembly further comprises a third hollow disk, which is disposed in an opposite side of the first hollow disk corresponding to the second hollow disk; and the third hollow disk is fixed with the lateral fixing portion, and is used to assist the first hollow disk being engaged with the second hollow disk by an up and down clamping method.

[0025] In one of the embodiments of the present invention, the electrical machinery is a high frequency vibration module, so that the cutting tool under the electricity supply tool holder generates a high frequency vibration when in a cutting operation.

[0026] In one of the embodiments of the present invention, the electrical machinery is a sensing module or a wireless signal module.

[0027] As described above, the electricity supply tool holder for the machining center according to the present invention can not only avoid an electrode wear phenomenon of a contact type electricity supply, but can also be used in a conventional machining center, to be further used in a machining center with an ATC system.

DESCRIPTION OF THE DRAWINGS

[0028] FIG. **1** is a perspective view of an electricity supply tool holder according to a preferred embodiment of the present invention;

[0029] FIG. **2** is a side view of the electricity supply tool holder according to the preferred embodiment of the present invention;

[0030] FIGS. **3**A-**3**B are schematic operation views of a clutch assembly of the electricity supply tool holder according to the preferred embodiment of the present invention;

[0031] FIGS. **4**A-**4**D are schematic operation views of the electricity supply tool holder according to the preferred embodiment of the present invention showing the electricity supply tool holder mounted on a machining center; and

[0032] FIGS. **5**A-**5**C are schematic operation views of the electricity supply tool holder according to the preferred embodiment of the present invention showing the electricity supply tool holder dismounted from the machining center.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0033] The foregoing objects, features, and advantages adopted by the present invention can be best understood by referring to the following detailed description of the preferred embodiments and the accompanying drawings. Furthermore, the directional terms described in the present invention, such as upper, lower, front, rear, left, right, inner, outer, side, etc., are only directions with reference to the accompanying drawings, so that the used directional terms are used to describe and understand the present invention, but the present invention is not limited thereto. In the drawings, units with similar structures use the same numerals.

[0034] An electricity supply tool holder for the present invention is used in a machining center, and more particularly in a machining center having a rotating shaft. Refer now to FIGS. **1** and **2**, FIG. **1** is a perspective view of an electricity supply tool holder according to a preferred embodiment of the present invention, and FIG. **2** is a side view of the electricity supply tool holder according to the preferred embodiment of the present invention. For clearly showing certain internal structures, some of the elements in FIG. **2** are shown using a cross-sectional method.

[0035] As shown in FIGS. **1** and **2**, an electricity supply tool holder **100** of a machining center according to the present invention comprises: a holder body **10**, a stationary coil portion **20**, a rotating coil portion **30**, a lateral fixing portion **40**, and a electrical machinery **50** (e.g. a high frequency vibration module). The holder body **10** is formed as a columnar, and

includes a holder shank **11** and a tool chuck **12**, wherein the holder shank **11** is disposed on an upper end of the holder body **10**, and is used for removably combining with a machining center (not shown); and the tool chuck **12** is disposed on a lower end of the holder body **10**, and is used for clamping and downwardly fixing a cutting tool **200**. The stationary coil portion **20** is coaxially and rotatably disposed on the holder body **10**, and is provided with at least one primary coil **21** therein; and the rotating coil portion **30** is coaxially and fixedly disposed on the holder body **10**, and is provided with at least one secondary coil **31** therein, wherein the secondary coil **31** corresponds to the primary coil **21**.

[0036] Furthermore, the lateral fixing portion **40** is fixed on a side of the stationary coil portion **20**, and is used for removably combining with a fixing location (not shown) of the machining center. The lateral fixing portion **40** comprises at least one set of input electrode portions **41**, which is used to electrically connect to an electric source provided by the machining center. The set of input electrode portions **41** is inwardly electrically connected to the primary coil **21** of the stationary coil portion **20** by at least one set of first electric wires **22**. The electrical machinery **50** (high frequency vibration module) is disposed inside the holder body **10**, and is electrically connected to the secondary coil **31** of the rotating coil portion **30** by at least one set of second electric wires **32**.

[0037] Additionally, the electrical machinery **50** (high frequency vibration module) must be provided an electric power for operation from an outside of the electricity supply tool holder **100**. When the electricity supply tool holder **100** is mounted on the machining center and starts to be rotated, an electric power/signal can be transmitted to the set of input electrode portions **41**, then to the primary coil **21** of the stationary coil portion **20** by the first electric wires **22**, and the secondary coil **31** of the rotating coil portion **30** is induced to generate an electric power/signal, then the electric power/signal is transmitted to operate the electrical machinery **50** (high frequency vibration module) by the second electric wires **32**, so as to support a machining operation with high frequency vibration.

[0038] In the present invention, except for the high frequency vibration module, the electrical machinery **50** also can be any other type of electrical machineries, which is disposed inside the holder body **10** and needs an external electric power. For example, a sensing module or a wireless signal module. Thus, the specific form of the electrical machinery **50** is not limited in the present invention. By the electricity supply tool holder **100** of the preferred embodiment, the electrical machinery **50** can obtain the electric power/signal that they need.

[0039] Preferably, the electrical machinery **50** is disposed close to the tool chuck **12** under the electricity supply tool holder **100**. Therefore, in the embodiment, the rotating coil portion **30** is disposed under the stationary coil portion **20**, so that the rotating coil portion **30** is closer the electrical machinery **50**. However, the specific locations of the stationary coil portion **20**, the rotating coil portion **30**, and the electrical machinery **50** are not limited in the present invention; they can be designed according to user's requirements.

[0040] Preferably, a waterproof quick connector can be adopted as the input electrode portions **41**, so as to be conveniently electrically connected to the electric power supplied by the machining center. Furthermore, the top of the lateral fixing portion **40** can be provided with a locating pin **42**, and the locating hole (not shown) is correspondingly disposed on the machining center. When the electricity supply tool holder **100** is mounted on the machining center, by combining the locating pin **42** and the locating hole, the lateral fixing portion **40** can be temporarily combining with a fixing location of the machining center. In another possible embodiment of the present invention, the input electrode portions **41** and the locating pin **42** are possibly integrated in one single element, which achieves the position and electric power connection between the lateral fixing portion **40** and the machining center.

[0041] Refer now to FIGS. **1**-**2** and **3**A-**3**B, FIGS. **3**A-**3**B are schematic operation views of a clutch assembly of the electricity supply tool holder according to the preferred embodiment of the present invention. For clearly expressing a correlation between elements of the clutch assembly, the distances between the elements are shown in a schematic way; other connecting elements are omitted.

[0042] AS shown in FIGS. **1** and **2**, the electricity supply tool holder **100** further comprises a control assembly **60** and a clutch assembly **70**, and the control assembly **60** at least includes a control element **61**. In the embodiment, the control element **61** can be an ejector pin assembly **61**. The ejector pin assembly **61** is movably disposed on the bottom of the lateral fixing portion **40**, and switchably has a first position (down) and a second position (up). The clutch assembly **70** at least includes a clutch element **71** and an engaged element **72**, wherein one end of the clutch element **71** is disposed inside the lateral fixing portion **40**, and the other end of the clutch element **71** is disposed close to the holder body **10**; the clutch element **71** corresponds to the control element **61** (the ejector pin assembly **61**) and moves therewith, and has a locked position and an unlocked position; and the engaged element **72** is fixedly connected with the holder body **10**.

[0043] Specifically, in the embodiment, the ejector pin assembly **61** comprises an ejector pin **611** and a hat-like bush **612** arranged up and down, wherein the diameter of a lower end of the hat-like bush **612** is greater than the diameter of an upper end thereof; the hat-like bush **612** is movably disposed on an upper end of the ejector pin **611**, and the ejector pin **611** and the hat-like bush **612** are slid up and down inside the lateral fixing portion **40**, and have a first position (down) and a second position (up); and the end of the clutch element **71** close to the lateral fixing portion **40** is formed as a hollow ring **711** (as shown in FIGS. **3**A-**3**B), which corresponds to the diameter of the upper end of the hat-like bush **612**, and is assembled therewith.

[0044] As shown in FIGS. **3**A-**3**B, an end of the clutch element **71** which is close to the holder body **10** is provided with a first hollow disk **712**, which has a center circle hole passed through by the holder body **10**, so that the first hollow disk **712** is coaxially and rotatably disposed on the holder body **10**; the engaged element **72** comprises a second hollow disk **721**, which corresponds to the first hollow disk **712**, and has a center circle hole passed through by the holder body **10**; and the second hollow disk **721** is fixed on the holder body **10** and can be rotated therewith.

[0045] Furthermore, the first hollow disk **712** of the clutch element **71** has at least one convex key **712***a* (there are two of the convex keys **712***a* symmetrically arranged in the figures), and the second hollow disk **721** of the engaged element **72** correspondingly has at least one concave groove **721***a* (there are two of the convex keys **712***a* symmetrically arranged in the figures). When the clutch element **71** is in the locked position, by the convex key **712***a* of the clutch element **71** and

the concave groove **721***a* of the engaged element **72**, the first hollow disk **712** of the clutch element **71** is engaged with the second hollow disk **721** of the engaged element **72**. Because the second hollow disk **721** is fixed with the holder body **10**, the lateral fixing portion **40** cannot be rotated corresponding to the holder body **10**, so it is in a locked situation (as shown in FIG. **3**A).

[0046] Therefore, when the ejector pin **611** is pushed by an external power, the ejector pin **611** pushes the hat-like bush **612**, then pushes the hollow ring **711** of the clutch element **71**, so as to raise the clutch element **71** from the locked position (down position) to the unlocked position (up position). At the same time, the first hollow disk **712** of the clutch element **71** is separated from the second hollow disk **721** of the engaged element **72** (as shown in FIG. **3**B). Although the second hollow disk **721** is fixed on the holder body **10**, the lateral fixing portion **40** can be rotated corresponding to the holder body **10** because the first hollow disk **712** is separated from the second hollow disk **721**, so it is in a unlocked situation.

[0047] Preferably, the clutch assembly **70** further comprises a third hollow disk **73**, which is disposed on an opposite side of the first hollow disk **712** corresponding to the second hollow disk **721**; and the third hollow disk **73** is fixed with the lateral fixing portion **40**, and is rotatably corresponding to the holder body **10**, the same as the first hollow disk **712**. When the first hollow disk **712** is engaged with the second hollow disk **721**, the third hollow disk **73** is used to assist the engagement by an up and down clamping method.

[0048] As shown in FIGS. **1** and **2**, the control assembly **60** further comprises at least one spring **62**. In the embodiment, on end of the spring **62** is fixed on an inner wall of the lateral fixing portion **40**, and the other end thereof is linked with the ejector pin **611**, so as to provide a restoring force required by the ejector pin **611**. In the other possible embodiments of the present invention, the spring **62** can be an extension spring or a compression spring, and can also be disposed in the other locations to assist the control assembly **60** switching between the first position and the second position.

[0049] Additionally, in the other possible embodiments of the present invention, the convex key **712***a* of the clutch element **71** and the concave groove **721***a* of the engaged element **72** can be interchanged. That is, the clutch element **71** has at least a concave groove and the engaged element **72** has at least a convex key. Besides, the number of the convex keys and the concave grooves are designed according to the user's requirements.

[0050] Furthermore, the engaging method or directions between the clutch element **71** and the holder body **10** are not limited in the present invention, and detail structures and linking methods are also designed according to the user's requirements. For example, the engaging method can be a frictional engagement or a point engagement; and the engaging directions can be in vertical, horizontal, or inside-outside directions. However, if the frictional engagement is adopted, for example a disk brake or a drum brake of vehicle wheels, the positioning effect and precision may be poor. Additionally, when the point engagement is adopted, the clutch element can include at least one convex portion and the engaged element can correspondingly include at least one concave portion, or the clutch element can include at least one concave portion and the engaged element can correspondingly include at least one convex portion, so that the engagement is achieved by disposing the convex portion and the concave portion on the clutch element and the engaged element of the clutch assembly.

[0051] As described above, the machining center of the present invention is, for example, an NC (Numerical Control) or CNC (Computer Numerical Control) machining center. The electricity supply tool holder **100** of the present invention can be mounted to the machining center by manual operation. In another way, because the electricity supply tool holder **100** can be accurately rotated to a certain angle and stopped, the electricity supply tool holder **100** can be further used in a machining center having an ATC (Automatic Tool Changing) system. If the electricity supply tool holder **100** has been mounted, it should be switched into the unlocked position, so that the holder body **10** can be rotated corresponding to the lateral fixing portion **40**; if the electricity supply tool holder **100** is going to be dismounted, it should be switched into the locked position, so that the holder body **10** cannot be rotated corresponding to the lateral fixing portion **40**; and therefore the electricity supply tool holder **100** is suitable for used in the ATC machining center.

[0052] Refer now to FIGS. **4**A-**4**D, FIGS. **4**A-**4**D are schematic operation views of the electricity supply tool holder according to the preferred embodiment of the present invention showing the electricity supply tool holder mounted on a machining center.

[0053] Firstly, as shown in FIG. **4**A, the electricity supply tool holder **100** of the present invention is preset in the locked position. That is, the clutch element **71** and the engaged element **72** are engaged together, and the lateral fixing portion **40** cannot be rotated corresponding to the holder body **10**. Then, the holder body **10** is aligned under a holder shank chuck **310** of a machining center **300**, and the lateral fixing portion **40** is aligned under a fixing location **320** of the machining center **300**.

[0054] Next, as shown in FIG. **4**B, the holder body **10** is raised, and the holder shank **11** of the electricity supply tool holder **100** is fixed with the holder shank chuck **310** of the machining center **300**. At the same time, the lateral fixing portion **40** is adjoined to the fixing location **320** of the machining center **300**, and the locating pin **42** of a top surface of the lateral fixing portion **40** is combining with the locating hole **320***a* of the fixing location **320**, so that the lateral fixing portion **40** is temporarily located in the fixing location **320** of the machining center **300**, and is electrically connected to an electric power supplied by the machining center **300** by at least one set of the input electrode portions **41**.

[0055] Next, as shown in FIG. **4**C, move an external push rod **330** under the clutch assembly **60**, and the clutch assembly **60** is now at the first position, meaning the clutch assembly **70** is located in the locked position.

[0056] Finally, as shown in FIG. **4**D, when the clutch assembly **60** is pushed upward by an external push rod **330** (shown as an upward arrow in the figure), the ejector pin **611** and the hat-like bush **612** of the clutch assembly **60** are pushed therewith, and the clutch assembly **70** is pushed to the unlocked position. Now, the first hollow disk **712** is separated from the second hollow disk **721** (shown as the upward arrow in the figure), the holder body **10** can be freely rotated corresponding to the lateral fixing portion **40**, so that the operation of mounting the electricity supply tool holder **100** on the machining center **300** is finished.

[0057] Refer now to FIGS. **5**A-**5**C, **5**A-**5**C are schematic operation views of the electricity supply tool holder accord-

ing to the preferred embodiment of the present invention showing the electricity supply tool holder dismounted from the machining center. Before dismounting the electricity supply tool holder **100** from the machining center **300**, as shown in FIG. **4**D, the electricity supply tool holder **100** has been set in the unlocked position. That is, the first hollow disk **712** is separated from the second hollow disk **721** by pushing the external push rod **330** upward, and the lateral fixing portion **40** can be rotated corresponding to the holder body **10**. When dismounting the electricity supply tool holder **100** from the machining center **300**, firstly, the machining center **300** controls the electricity supply tool holder **100** to be rotated to a location where the convex key **712***a* of the first hollow disk **712** corresponds to the concave groove **721***a* of the second hollow disk **721** (as shown in FIG. **3**B); next, the external push rod **330** is downwardly withdraw from the clutch assembly **60** (shown as a downward arrow in the figure), and the first hollow disk **712** and the second hollow disk **721** are into the locked position. That is, the convex key **712***a* of the first hollow disk **712** is engaged with the concave groove **721***a* of the second hollow disk **721** (shown as the downward arrow in the figure, and as shown in FIG. **3**A), and the lateral fixing portion **40** cannot be rotated corresponding to the holder body **10**.

[0058] Next, as shown in FIG. **5**B, remove the external push rod **330**.

[0059] Finally, as shown in FIG. **5**C, dismount the electricity supply tool holder **100** from the holder shank chuck **310** of the machining center **300**, so that the operation of dismounting the electricity supply tool holder **100** from the machining center **300** is finished.

[0060] As described above, an electricity supply tool holder **100** of a machining center **300** according to the present invention is provided, which comprises: a holder body **10**, a stationary coil portion **20**, a rotating coil portion **30**, a lateral fixing portion **40**, and an electrical machinery **50**. The stationary coil portion **20** is provided with at least one primary coil **21** therein; the rotating coil portion **30** is correspondingly provided with at least one secondary coil **31** therein; and the secondary coil **31** is electronically connected with the electrical machinery **50**. The lateral fixing portion **40** is fixed on a side of the stationary coil portion **20**, and is used for removably combining with a fixing location **320** of the machining center **300**. When the electricity supply tool holder **100** is mounted on the machining center **300** and starts to be rotated, the stationary coil portion **20** is fixed corresponding to the machining center **300**, and an electric power/signal can be transmitted through the lateral fixing portion **40** to the primary coil **21**, then inducing the secondary coil **31**, then the electric power/signal is transmitted to the electrical machinery **50**, so that a non-contact type electricity supply is achieved, which can avoid an electrode wear phenomenon of a contact type electricity supply. Additionally, when dismounting the electricity supply tool holder **100** from the machining center **300**, the lateral fixing portion **40** is switched into a locked position by a clutch assembly **70** to temporarily limited rotation corresponding to the holder body **10**, so that the electricity supply tool holder **100** can not only be used in a conventional machining center, but also can be used in a machining center with an ATC system.

[0061] The present invention has been described with preferred embodiments thereof and it is understood that many changes and modifications to the described embodiment can be carried out without departing from the scope and the spirit of the invention that is intended to be limited only by the appended claims.

1. An electricity supply tool holder for a machining center, used in the machining center having a rotating shaft, and comprising:

a holder body formed as a column and including a holder shank disposed on an upper end thereof and a tool chuck disposed on a lower end thereof, wherein the holder shank is used for removably combining with a holder shank chuck of an end of the rotating shaft of the machining center; and the tool chuck is used for clamping and downwardly fixing a cutting tool;

a stationary coil portion coaxially and rotatably disposed on the holder body and being provided with at least one primary coil therein;

a rotating coil portion coaxially and fixedly disposed on the holder body and being provided with at least one secondary coil therein, wherein the secondary coil corresponds to the primary coil;

a lateral fixing portion fixed on a side of the stationary coil portion and used for removably combining with a fixing location of the machining center, wherein the lateral fixing portion comprises at least one set of input electrode portions, one end of which is removably and electrically connected to an electric source of the machining center, and the other end of which is electrically connected to the primary coil of the stationary coil portion by at least one set of first electric wires; and

an electrical machinery disposed inside the holder body and electrically connected to the secondary coil of the rotating coil portion by at least one set of second electric wires;

wherein when the electricity supply tool holder is mounted on the holder shank chuck of the machining center and starts to be rotated, the machining center transmits an electric power/signal to the set of first electric wires, then to the primary coil of the stationary coil portion, and the secondary coil of the rotating coil portion is induced to generate an electric power/signal, then the electric power/signal is transmitted to operate the electrical machinery.

2. The electricity supply tool holder according to claim **1**, wherein the electrical machinery is disposed close to the tool chuck, and the rotating coil portion is disposed under the stationary coil portion so as to be close to the electrical machinery.

3. The electricity supply tool holder according to claim **1**, wherein the electricity supply tool holder further comprises a control assembly and a clutch assembly; the control assembly at least includes a control element, which is disposed inside the lateral fixing portion and switchably has a first position and a second position; the clutch assembly at least includes a clutch element and an engaged element; one end of the clutch element is disposed inside the lateral fixing portion, and the other end thereof is disposed close to the holder body; the clutch element corresponds to the control element and moves therewith, and has a locked position and an unlocked position; the engaged element is fixedly connected with the holder body; when the control element is located at the first position, the clutch element is moved therewith to the locked position, and is engaged with the engaged element on the holder body, so that the holder body cannot be rotated corresponding to the lateral fixing portion; and when the control element is

switched into the second position, the clutch element is moved therewith to the unlocked position, and is separated from the engaged element on the holder body, so that the holder body can be freely rotated corresponding to the lateral fixing portion.

4. The electricity supply tool holder according to claim **3**, wherein the control element is an ejector pin assembly, which is movably disposed on a bottom of the lateral fixing portion, and when the ejector pin assembly is pushed by an external push rod, the control element is switched from the first position to the second position.

5. The electricity supply tool holder according to claim **4**, wherein the ejector pin assembly comprises an ejector pin and a hat-like bush; the diameter of a lower end of the hat-like bush is greater than the diameter of an upper end thereof; the hat-like bush is movably disposed on an upper end of the ejector pin, and the ejector pin and the hat-like bush are slid up and down inside the lateral fixing portion; the end of the clutch element close to the lateral fixing portion is formed as a hollow ring, which corresponds to the diameter of the upper end of the hat-like bush, so that when the ejector pin is pushed by the external push rod, the hat-like bush is moved therewith and then pushes the clutch element from the locked position to the unlocked position.

6. The electricity supply tool holder according to claim **3**, wherein the clutch element has at least one convex portion, and the engaged element correspondingly has at least one concave portion, so that the clutch element is engaged with the engaged element by the convex portion of the clutch element and the concave portion of the engaged element.

7. The electricity supply tool holder according to claim **3**, wherein the clutch element has at least one concave portion, and the engaged element correspondingly has at least one convex portion, so that the clutch element is engaged with the engaged element by the concave portion of the clutch element and the convex portion of the engaged element.

8. The electricity supply tool holder according to claim **3**, wherein an end of the clutch element which is close to the holder body is provided with a first hollow disk, which has a center circle hole passed through by the holder body, so that the first hollow disk is coaxially and rotatably disposed on the holder body; and the engaged element is correspondingly provided with a second hollow disk, which has a center circle hole passed through by the holder body and fixed thereon.

9. The electricity supply tool holder according to claim **8**, wherein the first hollow disk of the clutch element has at least one convex key, and the second hollow disk of the engaged element correspondingly has at least one concave groove, so that the first hollow disk is engaged with the second hollow disk by the convex key of the clutch element and the concave groove of the engaged element.

10. The electricity supply tool holder according to claim **8**, wherein the first hollow disk of the clutch element has at least one convex groove, and the second hollow disk of the engaged element correspondingly has at least one concave key, so that the first hollow disk is engaged with the second hollow disk by the convex groove of the clutch element and the concave key of the engaged element.

11. The electricity supply tool holder according to claim **8**, wherein the clutch assembly further comprises a third hollow disk, which is correspondingly disposed on an opposite side of the first hollow disk corresponding to the second hollow disk; and the third hollow disk is fixed with the lateral fixing portion, and used to assist the first hollow disk engaged with the second hollow disk by an up and down clamping method.

12. The electricity supply tool holder according to claim **1**, wherein the electrical machinery is a high frequency vibration module, so that the cutting tool under the electricity supply tool holder generates a high frequency vibration when in a cutting operation;

13. The electricity supply tool holder according to claim **1**, wherein the electrical machinery is a sensing module or a wireless signal module.

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